(19) Europäisches Patentamt
European Patent Office
Office européen des br vets

(11) EP 0 957 059 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
17.11.1999 Bulletin 1999/46

(51) Int. Cl.[6]: **B66B 5/22**

(21) Application number: **99500075.9**

(22) Date of filing: **11.05.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **13.05.1998 ES 9800998**

(71) Applicant: **ORONA S. Coop.**
20120 Hernani, Gipuzkoa (ES)

(72) Inventor:
Madoz Michaus, Miguel A.
29120 Hernani, Gipuzkoa (ES)

(54) Safety braking device for an elevator

(57) The cabin braking device (1) is the caliper type (3), which straddles the rail (21) and has its housing (20) secured to the cabin. It is operated by a lever (10) in both the upward and downward direction in the event of overspeed, and it is provided with a mechanism (5,11,12,13) for operating the caliper (3), a pivoting wedge (6) moved by roller (5) in ore direction or the other, and roller (5) travel stops (3a) and springs (9) to adjust the braking force in either direction independently. The braking device components form a single and indivisible active part (2) in the housing (20), which moves (22) in relation to the latter.

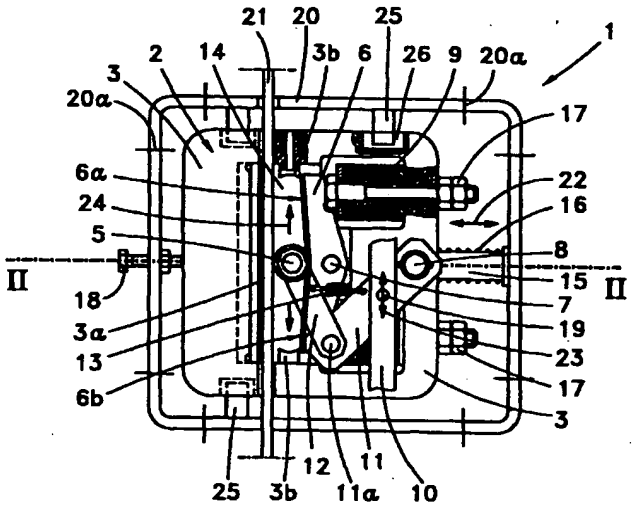

FIG. 1

EP 0 957 059 A2

Description

[0001] The present invention relates to the safety braking of a lift cabin, guided by a pair of side rails attached to the, structure of the building, the braking device being secured to the cabin to stop it in the event of overspeed when the cabin is either ascending or descending.

PRIOR ART

[0002] It is a consequence of the new regulations that, lift cabins should have a self-limiting device to safeguard persons in case of uncontrolled speed, not only during cabin descent, but also in ascent as well. The braking force should be different depending on the direction of travel and on the weight of the cabin and of its counterweight, and it should not be excessive so as to avoid sudden decelerations.

[0003] EP-440839 shows a safety braking system in which the device itself reduces the overspeed of an lift cabin which has a counterweight suspended by drive ropes, a pulley type speed controller with an actuating cable that detects the overspeed, two braking devices on each rail, one for each direction of travel, and an operating lever for each braking device, connected to the actuating rope. Each of the braking devices has a caliper that straddles the rail and an intermediate retaining wedge as well as means for adjusting the braking force of each of the two devices, which are independent of each other. Each braking caliper is attached to the cabin and the braking element is a retaining wedge, which moves linearly between the caliper arms to exert a friction force with its opposite face against the rail in proportion to its linear travel. The means of braking force adjustment are stop screws governing the length of this travel. The solution known in EP-440839 adds a second braking device for the upward speed to the cabins already installed prior to the afore-mentioned regulation.

[0004] US-4240529 describes a safety brake to act in case of cabin overspeed during descent only. It brakes smoothly by application of the pressure of the braking caliper against the rail in proportion to the overspeed. It employs an actuating wedge, which moves linearly between the rail and the caliper to move the latter against the rail, and it exerts a braking force to the extent that a graduated disc spring is compressed. The brake caliper is guided on transverse rods attached to the cabin.

DISCLOSURE OF THE INVENTION

[0005] The object of the invention is a safety braking device, mounted on each guide rail of an lift cabin to prevent its overspeed in cabin ascent and descent by means of independent actuating means, as defined in claim 1.

[0006] The braking device according to the invention is of compact construction, and they are equal units mounted in both rails, they being operated at the same time by the same lever connected to the activating cable. The braking device is the caliper type clasping the rail on both sides, and it has a moving active part enclosed entirely in a housing secured to the cabin. The active part comprises a caliper body, guide means for the transverse movement of the caliper during braking, a caliper actuating wedge, and a wedge operating mechanism. The active part of the braking device is operated by means of a lever connected to the aforesaid actuating cable, and all its constituent parts form a single indivisible body, acting in the same way in either direction of travel, but with a different braking force.

[0007] The braking force and friction against the rail is exerted with a single, easily replaceable brake shoe, belonging to the caliper body. The braking device also has means belonging to the actual active part to return the caliper body and the actuating mechanism to its initial rest position after bringing the cabin to a halt and detaching it from the rail.

[0008] DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of the braking device according to the invention.

FIG. 2 is a cross-section view of the braking device of figure 1, from the line II-II.

PREFERRED EMBODIMENT OF THE INVENTION

[0009] With reference to figures 1 and 2, the preferred embodiment of braking device 1 comprises a housing 20 secured to the cabin by means of rear and side screws 20a, and an active part 2 moving in housing 20 according to arrows 22. The active part 2 comprises a caliper body 3, a replaceable shoe 3 which presses against one of the sides of guide rail 21, an actuating wedge 6 pivoting around the centre pin 7, an actuating mechanism formed by the two hinged links 11 and 12 and roller 5, a pair of disc springs 9 for regulating the braking force, and rods 15 and springs 16 to push active part 2 to its rest position. The whole active part 2 is guided in its movement by the two pairs of side lugs 25, in the direction of arrows 22, housed in the respective slot 26 in the housing, in order to bring shoe 3a up against rail 21 during braking, whilst also preventing the relative movements of active part 2 in the other two directions. The travel of active part 2 is governed by stop screw 18, threaded into one of the side walls of said housing 20, and by helical spring 16 against the other side wall.

[0010] The overspeed preventer and the actuating rope are known items, which have not been represented in the drawings. The first link 11 of the brake actuating mechanism is connected at point 19 to th operating lever, which moves wh n actuated in either of the vertical directions of arrows 23, depending on whether the

cabin is travelling upwards or downwards. The second link 12 is hinged to link 11 by means of a pivot pin 11a and roller 5 is connected to link 12 by means of swivel pin 5a. Roller 5 runs on the side of rail 21, within housing 14 formed between rail 21 and wedge 6, in either of the two directions 24.

[0011] The roller 5 is held in its rest position, as long as lever 10 connected to the operating rope is not actuated, as shown in figure 1, resting against the apex of the central angle of wedge 6 under the effect of tension spring 6, which draws link 12 towards link 11. When the lever 10 is actuated, the link 11 is pushed up or down according to arrow 23, pivoting around floating the pin 8. Owing to the narrowing of housing 14 from the centre towards either end, produced by the two cuneiform surfaces 6a and 6b, roller 5 pushes wedge 6, causing it to pivot on its centre pin, inserted in caliper body 3, in one direction or the other depending on whether the braking is during ascent or descent. The braking force regulating disc springs 9 are housed in caliper body 3. The end of wedge 6 exerts pressure on spring 9, moving the whole active part 2 in direction 22, until shoe 3a comes up against the side of rail 21. At that moment the pivoting of wedge 6 encounters the opposition of the respective spring 9, of which the one that acts during ascent is graduated to exert a smaller counterforce so that braking is gentler in ascent than in descent. To the extent that roller 5 continues running under the pressure of link 12, the braking force against the rail will be greater, up to a travel limit 22 in both directions, governed by a respective stop screw 3b attached to the caliper body. In the meantime the other spring 9 will remain inactive as it is separated from the other end of the wedge 6, moving away from it. The disc springs 9 are held in place by means of screws 17 at either end and their linear contraction during braking is always the same, for instance 3 mm, thereby determining this counterforce.

[0012] The pivot pin 8 of the first link 11 is connected by means of a synchronizing rod 8c to its counterpart pivot pin in the second rail device 21, so that operating lever 10, connected at point 19 of the first link 11, operates the braking devices of both rails at the same time. When safety braking is effected, for example during cabin ascent, braking device 1 is disengaged from rail 21, moved downwards by the weight of the cabin, and roller 5 returns to its rest position drawn by spring 13, the rotation of link 11 being released by the opposing force of torsion spring 8b.

Claims

1. A safety braking device for the cabin of a lift cabin guided along two side rails (21), of the caliper type (3) clasping the rail on both sides and with its housing (20) secured to the cabin, and which is operated by a lever (10) in both upward and downward direction in case of cabin overspeed, the braking device (1) being provided with a caliper body (3) for braking, means (5,6,8,11,12) for operating the brake connected to this operating lever (10), and means (3b, 9) for adjusting the braking force in either direction individually, characterized in that the caliper body (3), the operating means (5,6,8,11,12) and the regulating means (3b,9) form a single and indivisible active part (2) within the housing (20), and is displaced (22) in relation to the housing (20) against the rail (21) for braking the cabin.

2. The device of claim 1, wherein the braking means (3, 3a), the operating means (5,6,8,11,12) and the regulating means (3b, 9) comprise an intermediate pivoting wedge (6), a roller (5), which runs on rail (21) and pushes the pivoting wedge (6) in either direction to displace (22) the active part (2), and a compression spring (9) at either end of the wedge, the travel (24) of the roller and the setting of the springs (9) being the decisive factor in the braking force.

3. The braking device of claim 1, wherein the operating means (5,6,8,11,12) also comprise a mechanism of two jointed links (11,12) and a floating pivot pin (8), connected to roller (5) and to the vertical operating lever (10).

4. The braking device of claim 1, wherein this transverse movement (22) of the active part (2) is guided by two pairs of lugs (25) housed in their respective slot (26) in the housing (20) and governed by a stop screw (18) at one end of the housing (20).

5. The braking device of claim 1, wherein in order to make the actuating roller (5) return to its rest position, the operating means (5,6,8,11,12) are connected to one another by means of spring (13) and to the operating lever (10) with a torsion spring (8b).

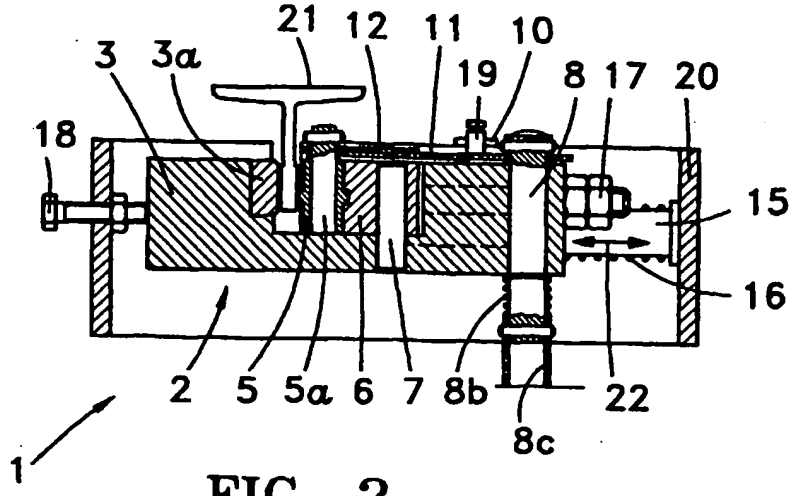
21
12
11
10
3
3a
19
8
17
20
18
15
16
2
5
5a
6
7
8b
22
8c
1

FIG. 2

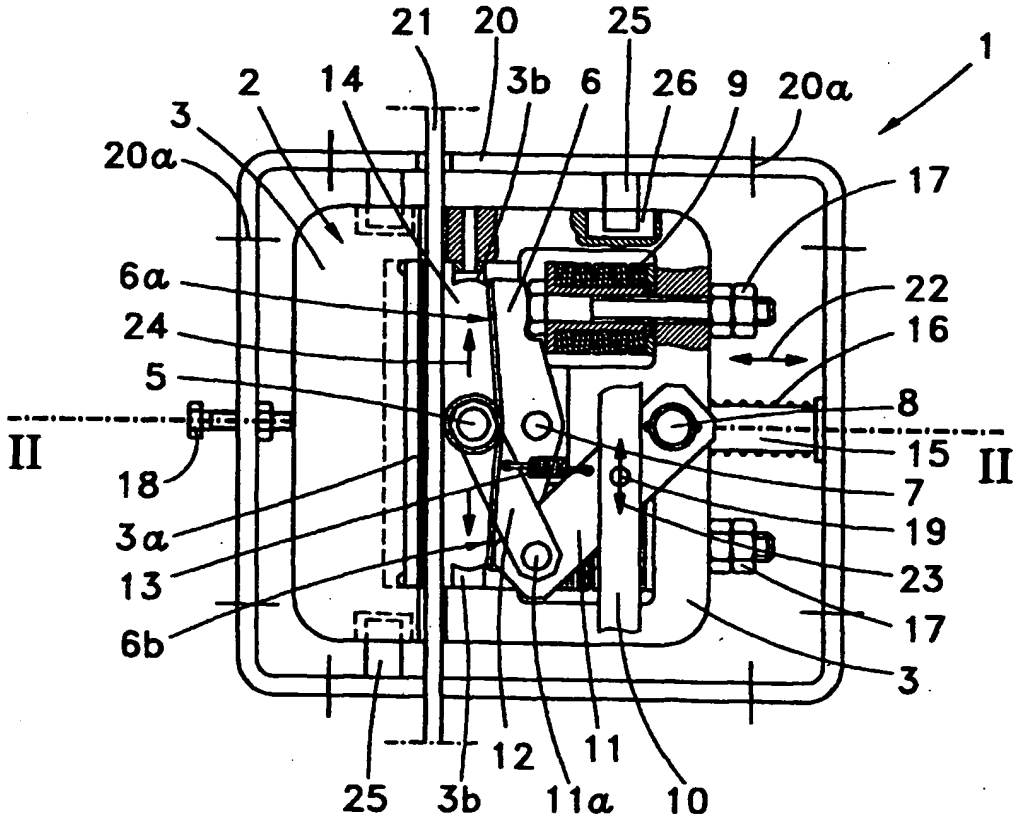
21
20
25
1
2
14
3b
6
26
9
20a
3
20a
17
6a
22
24
16
5
8
II
II
18
15
7
3a
19
13
23
6b
17
3
12
11
25
3b
11a
10

FIG. 1